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Naval Battle Groups***



Application of PC/104 Architecture in the EA-6B Prowler IOCP

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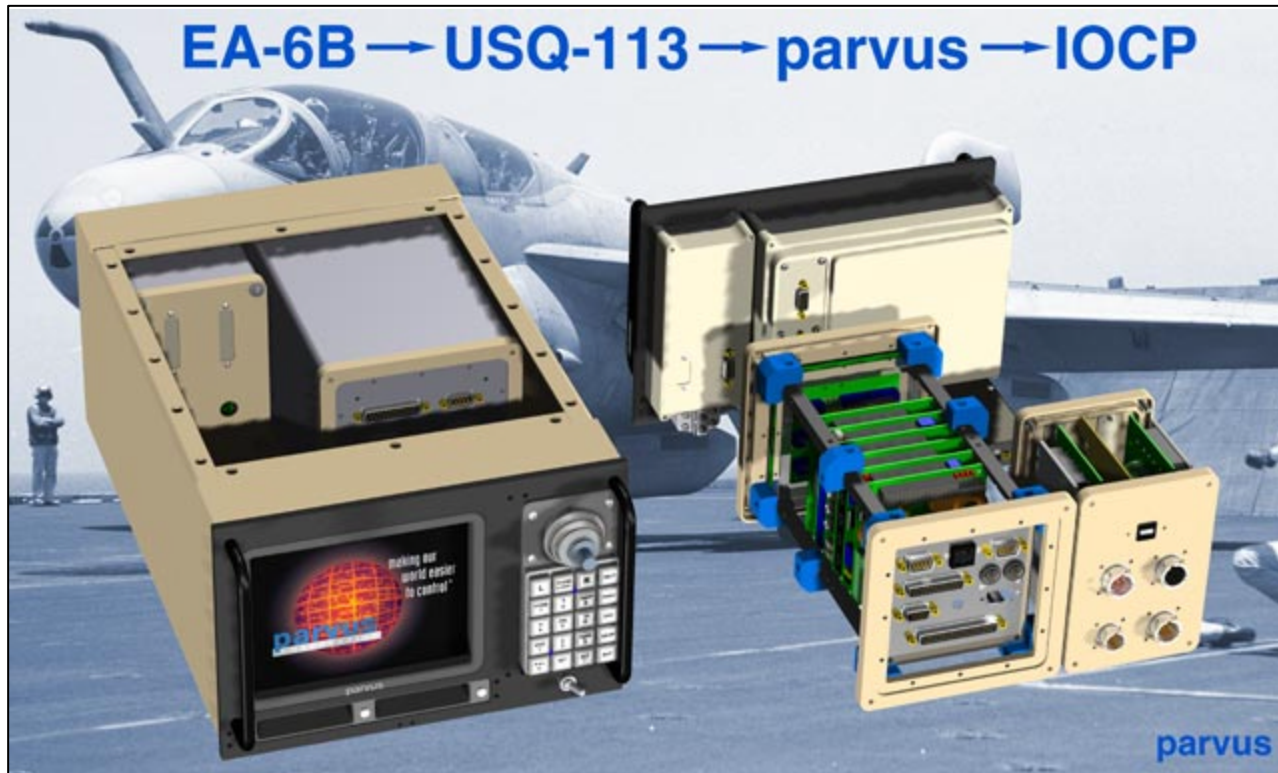


EA-6B Prowler



- Integrated Electronic Warfare System
- Radar and Communications Jamming

AN/USQ-113(v)3 Radio Countermeasures Set Upgrade



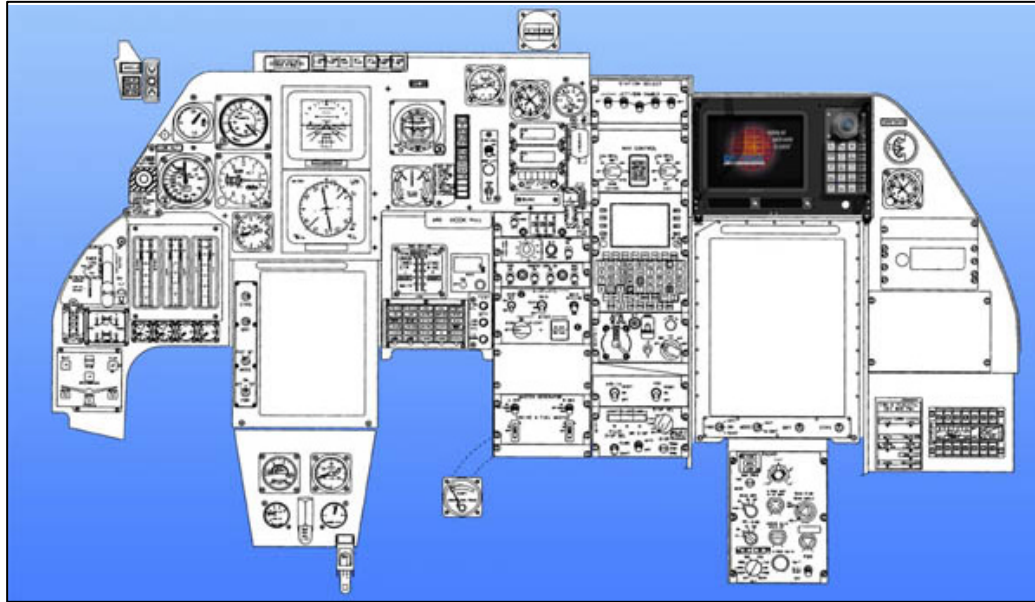
Improved Operator Control Panel (IOCP)

Challenges Faced



- Time to Market
- Size Considerations
- Weight Limitations Coupled with High-Functionality Requirements
- Use of Spinning Media in High Impact Environment
- Concurrent Engineering -- Product Refinement During LRIP
- Environmental Requirements -- Altitude, High G Shock, Carrier Launch & Recovery, Extreme Temperatures, Humidity, EMI

Improved Operator Control Panel

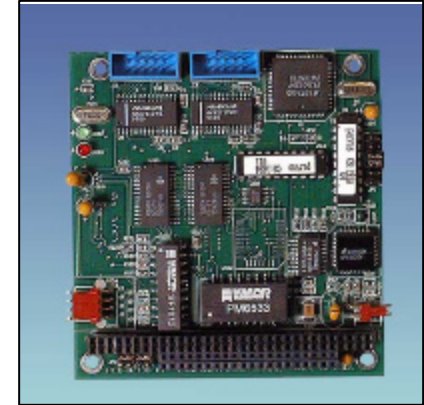


- Upgrade to Existing Laptop Implementation
- Concept to Prototype: 16 Weeks
- Prototype to Product: 6 Weeks
- Based on Embedded PC/104 Architecture



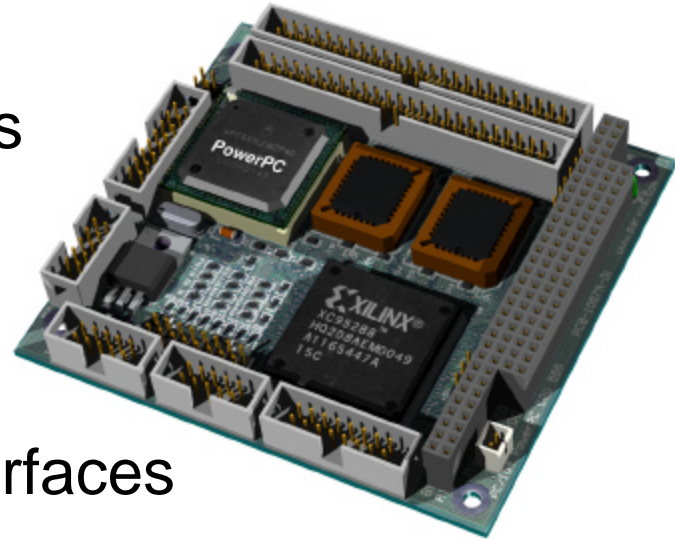
What is PC/104?

- Industry Standard (IEEE Draft P966.1)
- Ruggedized Adaptation of AT Bus
- Pin & Socket Connectors (ISA & PCI)
- Stackable Design for Expansion
- Modular PC-Compatible Circuit Board
- Compact Form Factor (3.775" x 3.550")
- Low Power Consumption
- Supported by 200+ Vendors Worldwide, 1000s of Products



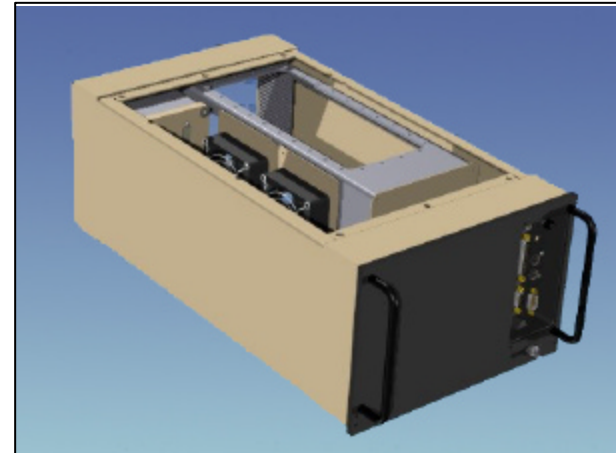
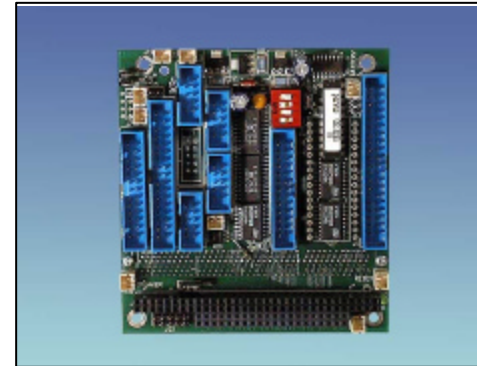
Broad PC/104 Offerings

- Digital I/O
- Avionics Bus Interfaces
- CPUs
- Power Supplies
- Floppy/Hard Drive Interfaces
- Data Acquisition Modules
- Network Interfaces
- PCMCIA Interfaces
- GPS Receivers
- And Much More



Advantages From PC/104 Design

- Modular Components
- 80 –100% of Components are Commercially Available Off-The-Shelf (COTS)
- Smaller/Cheaper than VME
- Inherently Rugged
- Supports PC-Compatible Software
- Standards-Based

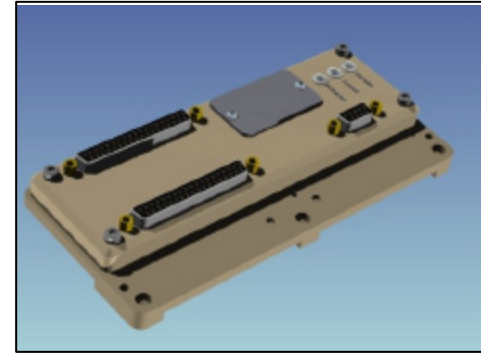


IOCP System Features

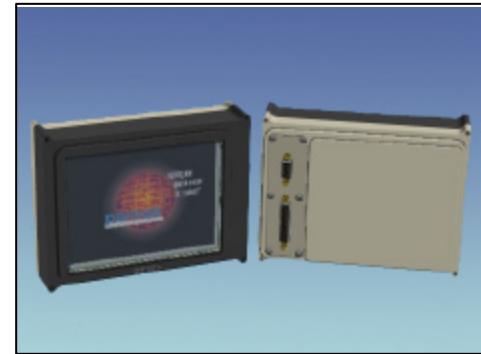
- x86 CPU
- Windows 95 OS
- Ethernet NIC
- Ethernet Hub
- Sound Card
- 6.4" LCD
- MIL-STD-704D Power Supply
- Removable Mass Storage
- Aluminum Enclosures
- Removable Railed Card Cage
- EMI Shielding and Gasketing



Additional Special Features



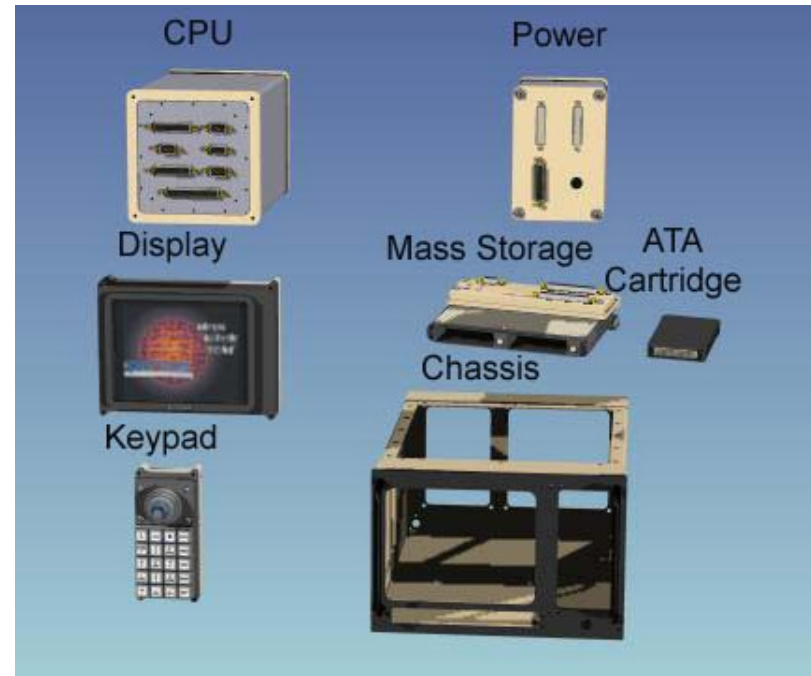
- Extended Temp Operation
- Shock/Vibration Tolerance
- Security Features
 - Zeroization Capability
 - Removable Memory Cartridges
- LCD Enclosed in “Pressure Vessel”
- Operator Interface - Joystick/Keypad
- Standard Software Development



System Development Techniques

- Modular Sub-Systems

- Chassis
- Power
- Display
- CPU
- Mass Storage
- Keypad / Joystick



- Standards Approach:

- x86 – IDE, VGA, Software Compatibility, Operating System
- 1 ATR – ARINC 404A Avionics Standard
- PC/104 – Embedded PC, Inherently Rugged, Widely Sourced

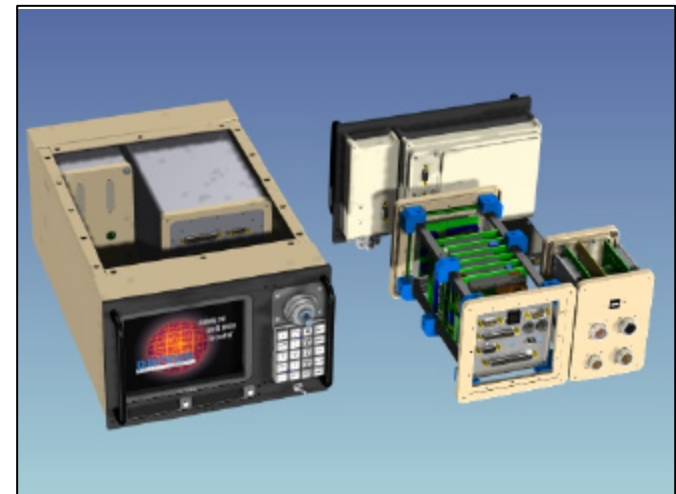
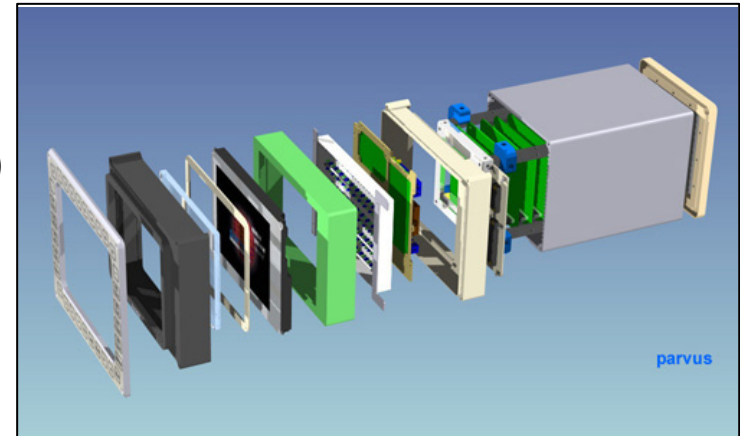
System Development Techniques (Cont)

- 3-D Prototyping - Concept to Reality



System Development Techniques (Cont)

- Shock Mitigation
 - Card Cage (Silastic Shock Rocks)
 - Mass Storage Module (Silastic Boot)
 - LCD Display (Silastic Boot)
 - Pressure Vessel
- EMI Emission & Susceptibility
 - Gasketing
 - Enclosure Within Enclosure
 - Filters



Environmental Testing



- Altitude
 - Over 10,000 Ft Above Sea Level
- Temperature
 - Operating: -20°C to +50°C; Storage: -40°C to +70°C
- Humidity
 - 95% Relative Humidity – 5/15 day cycles @ 40°C
- Vibration
 - 1G Sine Sweeps: 20 to 2000 Hz, 8 hrs each
- Shock
 - 18 Half Sine Shock Pulses, 5G Amplitude, 11 Minutes
- Salt/Fog
 - 2 Hours @ 35°C (pH 6.5 to 7.2); 24 hours w/ Atomized Salt Solution; 24 Hours Dry Test
- Explosive Decompression
 - 8,000 to 35,000 Feet in 0.5 Seconds

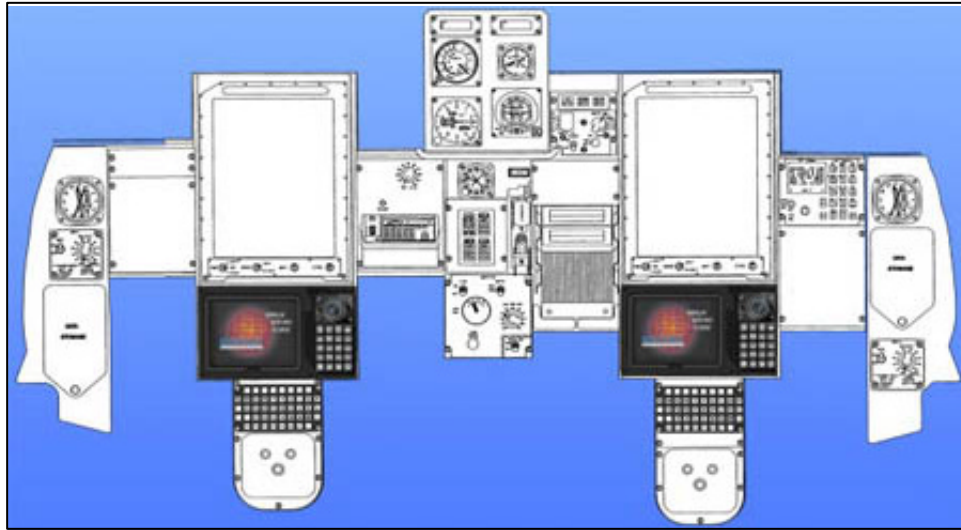
Customer Focus



- Delivered within Spec in 4 Months
- First Article Accepted with Positive Field Feedback
- Customer Feedback Led to Product Upgrades

Product Progression -

Upgrades & Concepts



- Full Night Vision Capability
- MIL-STD-1553/Arinc 429
- Fast Ethernet Connectivity
- Pentium Class CPU
- Gigabyte Memory Storage
- Voice Command Control

Voice Command and Control



- Speaker Independent ASR (No User Training)
- Patented Neural Network Recognition Process
- Noise Immune (Ambient Background Noise Extraction)
- High Accuracy (Recognition) Rate
- Natural User Interaction
- Hardware Embedded Solution

Key To Success: PC/104 COTS Design



- Standards-Based Architecture
- Modular Design Flexibility
- Simple Implementation
- Rapid Development
- Inherent Ruggedness
- Reduced Cost
- High Availability

Thank you!



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